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10/763,578	01/21/2004	Robert W. Bower	BOW5075.14A1	4912

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EXAMINER	
JEFFERSON, QUOVAUNDA	
ART UNIT	**PAPER NUMBER**
2823	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/763,578	BOWER, ROBERT W.	
	Examiner	Art Unit	
	Quovaunda Jefferson	2823	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 June 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-28* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-28* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☒ Other: PAJ. 07-029911

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on June 6, 2007 has been entered.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 3, 6, 7, 12, 13, 15, 18, 19, 21, and 24-26 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The term "high rate of diffusion of hydrogen" in claims 7, 13, 19, 25, and 26 is a relative term, which renders the claim indefinite. The term " high rate of diffusion of hydrogen" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

Claims 7, 13, 19, 25, and 26 recite the limitation of a diffusion layer with a "high rate of diffusion of hydrogen". However, the claims fail to recite a specific value or range of values that would constitute a diffusion layer that which would meet this limitation.

The term "high degree of electrical and thermal insulation" in claims 6, 12, 18, 24, and 26 is a relative term which renders the claim indefinite. The term " high degree of electrical and thermal insulation " is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

Claims 6, 12, 18, 24, and 26 recite the limitation of an insulator layer that provides “a high degree of electrical and thermal insulation”. However, the claims fail to recite a specific value or range of values that would constitute an insulator layer that would meet this limitation.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-26 are rejected under 35 U.S.C. 102(b) as being anticipated by Toshiba Corporation (herein referred to as "Toshiba"), Patent Abstract of Japan 07-029911.

Regarding claim 1, Toshiba teaches a multilayered material for fabrication of a nanodevice, comprising of a device layer **24,** and a substrate layer **23a, 22a, 21a, 21b, 22b, 23b,** said substrate layer having a top surface adjacent said device layer, and a bottom surface, wherein said substrate layer comprises a diffusion layer **22a, 22b** having a collection region adapted for capture of hydrogen, wherein the collection region **22a** is positioned away from the bottom surface of the substrate and toward the top surface, and wherein the substrate layer is adapted for diffusion of hydrogen from the bottom surface to the collection region (**using layer 22b**. [0033, 0041, and drawing 1).

Regarding claim 2, Toshiba teaches said substrate layer further comprises an insulator layer **23a** between said device layer **24** and said diffusion layer **22b** and wherein the collection region is adjacent the insulator layer (drawing 1).

Regarding claim 3, Toshiba teaches said collection region is a heavily doped region for capture of hydrogen [0033].

Regarding claim 4, Toshiba teaches said collection region is a getter/acceptor region for capture of hydrogen [0033, 0041].

Regarding claim 5, Toshiba teaches said device layer comprises a material having at least a portion that has been optimized for fabricating said nanodevice [0041].

Regarding claim 6, Toshiba teaches said insulator layer comprises a material that provides a high degree of electrical and thermal insulation between the diffusion layer and the device layer [0041].

Regarding claim 7, Toshiba teaches said diffusion layer comprises a material optimized for a high rate of diffusion of hydrogen therethrough [0052].

Regarding claim 8, Toshiba teaches a multilayered material for fabrication of a nanodevice, comprising of a device layer **24** and a substrate layer **23a, 22a, 21a, 21b, 22b, 23b,** said substrate layer having a top surface **23a** adjacent said device layer, and a bottom surface **23b**, wherein said substrate layer comprises a diffusion layer **22a,** 22b having a collection region adapted for capture of hydrogen, wherein said substrate layer

further comprises an insulator layer **23a** between said device layer and said diffusion layer, wherein the collection region **22a** is positioned away from the bottom surface of the substrate and toward the top surface, wherein the collection region **22a** is adjacent the insulator layer, and wherein the substrate layer is adapted for diffusion of hydrogen from the bottom surface to the collection region (**using layer 22b**. [0033, 0041, and drawing 1).

Regarding claim 9, Toshiba teaches said collection region is a heavily doped region for capture of hydrogen [0033].

Regarding claim 10, Toshiba teaches said collection region is a getter/acceptor region for capture of hydrogen [0033, 0041].

Regarding claim 11, Toshiba teaches said device layer comprises a material having at least a portion that has been optimized for fabricating said nanodevice [0041].

Regarding claim 12, Toshiba teaches said insulator layer comprises a material that provides a high degree of electrical and thermal insulation between the diffusion layer and the device layer [0041].

Regarding claim 13, Toshiba teaches said diffusion layer comprises a material optimized for a high rate of diffusion of hydrogen therethrough [0052].

Regarding claim 14, Toshiba teaches a multilayered material for use in fabrication of a nanodevice, comprising of a device layer **24,** an insulator layer **23a** adjacent said device layer, and a diffusion layer **22a, 22b** having a collection region adapted for capture of hydrogen adjacent said insulator layer, wherein the diffusion layer has a bottom surface, wherein the collection region is positioned away from the bottom surface (**of substrate layers 21a, 21b**) and toward the insulator layer, and wherein the diffusion layer **22a, 22b** is adapted for diffusion of hydrogen from the bottom surface to the collection region.

Regarding claim 15, Toshiba teaches said collection region is a heavily doped region for capture of hydrogen [0033].

Regarding claim 16, Toshiba teaches said collection region is a getter/acceptor region for capture of hydrogen [0033, 0041].

Regarding claim 17, Toshiba teaches said device layer comprises a material having at least a portion that has been optimized for fabricating said nanodevice [0041].

Regarding claim 18, Toshiba teaches said insulator layer comprises a material that provides a high degree of electrical and thermal insulation between the diffusion layer and the device layer [0041].

Regarding claim 19, Toshiba teaches said diffusion layer comprises a material optimized for a high rate of diffusion of hydrogen therethrough [0052].

Regarding claim 20, Toshiba teaches a multilayered material for use in fabrication of a nanodevice, comprising of a layer of material **24** for device fabrication, a layer of insulator material **23a, 23b** and a layer of material **22a, 22b, 23a, 23b,** though which hydrogen can diffuse at a high rate and having a collection region adapted for capture of hydrogen, wherein said layer of insulator material is disposed between said layer of material for device fabrication and said collection region, wherein the layer of material **22a, 22b** through which hydrogen can diffuse has a bottom surface, wherein the collection region **22a, 22b** is positioned away from the bottom surface (**22a is positioned of substrate layers 21a, 21b and 22b is positioned away from bottom surface of 23b**) and toward the layer of insulator material **23a, 23b**, and wherein the layer of material through which hydrogen can diffuse is adapted for diffusion of hydrogen from the bottom surface to the collection region ([0033, 0041, and drawing 1).

Regarding claim 21, Toshiba teaches said collection region is a heavily doped region for capture of hydrogen [0033].

Regarding claim 22, Toshiba teaches said collection region is a getter/acceptor region for capture of hydrogen [0033, 0041].

Regarding claim 23, Toshiba teaches said device layer comprises a material having at least a portion that has been optimized for fabricating said nanodevice [0041].

Regarding claim 24, Toshiba teaches said insulator layer comprises a material that provides a high degree of electrical and thermal insulation between the diffusion layer and the device layer [0041].

Regarding claim 25, Toshiba teaches said diffusion layer comprises a material optimized for a high rate of diffusion of hydrogen therethrough [0052].

Regarding claim 26, Toshiba teaches a multilayered material for use in fabrication of a nanodevice, comprising of a layer of material for device fabrication **24**, said material having at least a portion that has been optimized for fabricating said nanodevice, a layer of material **22a, 22b, 23a, 23b, 21a, 21b** though which hydrogen can diffuse at a high rate and having a collection region **22a, 22b** adapted for capture of hydrogen, said collection region comprising a heavily doped region or a getter/acceptor region, wherein said layer of material through which hydrogen can diffuse comprises a material optimized for a high rate of diffusion of hydrogen therethrough, and a layer of insulator material **23a, 23b**, wherein said layer of insulator material provides a high degree of electrical and thermal insulation between the layer of material through which hydrogen can diffuse and the layer of material for device fabrication,(e) wherein the

layer of insulator material is disposed between the layer of material **24** for device fabrication and the layer of material **22a, 22,b**through which hydrogen can diffuse, wherein the layer of material **22a, 22b, 23a, 23b, 21a, 21b** through which hydrogen can diffuse has a bottom surface, wherein the collection region is positioned away from the bottom surface(**22a is positioned of substrate layers 21a, 21b and 22b is positioned away from bottom surface of 23b** and toward the layer of insulator material **23a, 23b**, and wherein the layer of material through which hydrogen can diffuse is adapted for diffusion of hydrogen from the bottom surface to the collection region ([0033, 0041, 0052 and drawing 1).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Toshiba as applied to claims 1, 8, 14, 20 or 26 above, and further in view of Kosaki, US Patent 5,200,641 (as cited in previous Office Action).

Regarding claim 27, Toshiba fails to teach at least one heat dissipation layer.

Kosaki teaches the use of a heat dissipation layer (abstract) as a metal layer that is placed on the rear surface of the semiconductor substrate to remove heat from the semiconductor device, thereby reducing the chance of device failure due to overheating of the semiconductor circuit.

It would be obvious to one of ordinary skill in the art at the time of the invention to combine the teachings of Kosai with that of Toshiba because a heat dissipation layer made of a metal layer is placed on the rear surface of the semiconductor substrate to remove heat from the semiconductor device, thereby reducing the chance of device failure due to overheating of the semiconductor circuit.

Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over Toshiba as applied to claims 1, 8, 14, 20 or 26 above, and further in view of Schelhorn, US Patent 4,383,270 (as cited in previous Office Action).

Regarding claim 28, Toshiba fails to teach at least one RF shield layer.

Schelhorn teaches a material comprising at least one RF shield (column 4, lines 24-25) made of copper. The copper RF shield protects the semiconductor from RF energy and considerably reduces the magnetic effect of the substrate would other wise be exposed to, which would result in electrical losses.

It would be obvious to one of ordinary skill in the art at the time of the invention to combine the teachings of Schelhorn with that of Toshiba because the copper RF shield protects the semiconductor from RF energy and considerably reduces the magnetic effect of the substrate would other wise be exposed to, which would result in electrical losses.

Response to Arguments

Applicant's arguments with respect to claims 1-28 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US Patent 5,940,735, issued to Mehta et al, teaches reduction of charge loss in memory cell by phosphorus implantation onto a nitride/oxynitride layer to form a hydrogen getter layer.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Quovaunda Jefferson whose telephone number is 571-272-5051. The examiner can normally be reached on Monday through Friday, 7AM to 3:30PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Smith can be reached on 571-272-1907. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

QVJ

FERNANDO L. TOLEDO
PRIMARY PATENT EXAMINER